ATTACHMENT 2

STANDARD SPECIFICATIONS FOR THE PREPARATION OF ROADWAY CONSTRUCTION PLANS

CRITERIA: The CONSULTANT shall become familiar with and use the latest, as determined by the DEPARTMENT, American Association of State Highway and Transportation Officials (AASHTO) Design Manuals for Arterial Streets, Rural, Urban and Interstate Highways, including those standards adopted by the AASHTO and approved by the Secretary of Commerce, as provided by Title 23, United States Code, Section 109 (b), with the DEPARTMENT'S Standards, Procedures, Plans, Specifications and Methods, with Federal Highway Administration procedures relating to plan review and approval, and shall produce plans in accordance therewith.

DESIGN SPECIFICATIONS AND GUIDELINES: Geometric Design for roadways, bridges and other structures shall be in accordance with the AASHTO Design Specifications, current edition, as approved by FHWA and adopted by the DEPARTMENT; AASHTO Guide Specifications for Horizontal Curved Highway Bridges; AASHTO Standard Specifications for Structure Supports for Highway Signs, Luminaires and Traffic Signals dated 1985; and AASHTO Roadside Design Guide, current edition; and AASHTO Manual on Uniform Traffic Control Devices, current edition. The lighting design shall be in accordance with the American National publication, "An IES RP-8-00 Roadway Lighting" and "IES-RP-22-96 Recommended Practice for Tunnel Lighting", and the Standard Specifications for Construction of Roads and Bridges, current edition, as modified by Supplemental Specifications and Special Provisions, current editions. Plans and specifications shall conform to the requirements of the DEPARTMENT'S Standard Specifications and Supplemental Specifications, current edition, the Georgia Department of Transportation Manual on Drainage Design for Highways, and Highway Capacity Manual, current edition (T.R.B.). Design shall conform to AASHTO design standards for the appropriate classification and speed design as indicated in the project concept. Any deviation will require prior approval in writing by the DEPARTMENT'S. On facilities where driveways are included, the CONSULTANT shall become familiar with the DEPARTMENT'S regulations and procedures and shall produce plans for upgrading driveway control, and shall conform to the DEPARTMENT'S Driveway Manual. Any deviation will require a written design exception or variance be approved prior to incorporating the deviation in the work. The CONSULTANT shall prepare the required design exception or variance request for approval

by DEPARTMENT and/or the FHWA, in accordance with the DEPARTMENT'S Plan Development Process (PDP). In addition to the references listed above, the following references shall be used in the development of this project:

- Electronic Data Guidelines dated March 15, 2004
- Autoturn CAD program by Transoft Solutions.
- Manual of Uniform Traffic Control Devices "MUTCD" by the U.S. Department of Transportation, Federal Highway Administration "FHWA".
- Manual of Drainage Design for Highways by the Georgia Department of Transportation, "GDOT".
- Roadway and Bridge Standard Plans by the "GDOT" Road and Airport Design Office. Design and plan preparation shall also be in accordance with the Certification Acceptance Authorized by 23 USC 117(a) for Administering Federal Aid Projects Not On Interstate System, dated 6-1-90.
- Construction Details by the "GDOT" Road and Airport Design Office.
- Pay Item Index by the "GDOT" State Transportation Office Engineer.
- Rules and Regulations for Driveway and Encroachment Control by the "GDOT".

This list is not intended to be all inclusive. All references shall be current editions. Any current editions that are written in metric units shall be "soft converted" to U.S. Standard Units. Any rounding will be to the dimension that will increase safety.

CONSTRUCTION PLAN SPECIFICATIONS: The plans shall be in accordance with the DEPARTMENT'S Standard Specifications for Construction of Transportation Systems, as amended. The DEPARTMENT will furnish the Georgia Standard Construction and Materials Specifications for use throughout the PROJECT in PDF format. The plans shall be developed in accordance with the DEPARTMENT'S Plan Presentation Guide (PPG).

PLAN SIZES: Plans for roadway, drainage, utilities, bridges and walls shall be reproducible quality ink drawings. The drawings shall be on four (4) mil thick mylar with matte finish on both sides or on 20# white engineering bond paper with a minimum performance grade of 87% brightness, as required. The sheets shall have outside dimensions of 36" by 23" with 2" margin on the left and ½" margin elsewhere and be produced by a Microstation CADD system.

CONSTRUCTION PLAN REQUIREMENTS AND SCALE: The plans shall be fully dimensioned in English units; all elevations necessary for construction shall be shown similar to the DEPARTMENT'S normal practice. All plans shall be prepared on the scales listed below, unless otherwise approved by the DEPARTMENT. Drawings and lettering shall be such as to produce clear and legible reproductions when reduced to half-size. The scale of sheets should be as follows:

1. 1"=10'
    (a) preliminary layouts for walls.
    (b) roadway cross sections 1" = 10' horizontal and 1" = 10' vertical Note: Cross sections may have to be plotted lengthwise on the sheet to avoid folded sections.
    (c) Driveway profile sheets horizontal 1" = 10', vertical 1" = 20'
2. 1" = 20'
    (a) roadway plan sheets for urban-type projects
    (b) roadway profile sheets for urban-type projects 1" = 20' horizontal, 1" = 10' vertical
    (c) gore detail sheets
    (d) intersection detail sheets
    (e) drainage profile sheets 1" = 20' horizontal, 1" = 10' vertical.
    (f) detours for urban projects
    (g) preliminary layouts for bridges
3. 1" = 50'
    (a) roadway plan sheets for rural-type projects
    (b) roadway profile sheets for rural-type projects 1" = 50' horizontal, 1" = 10' vertical
4. 1" = 100'
    (a) cover sheet
    (b) stage construction
5. 1" = 200'
    (a) stake out sheet
    (b) property map
    (c) drainage area map

The CONSULTANT shall check all details and dimensions shown on the plans before they are submitted to the DEPARTMENT for review. Topography shall remain fully legible when plans are reduced in size,

but shall be less prominent and readily distinguishable from proposed work. Profile sheets shall have the existing ground line dashed and the required profile in a solid line. All other plan sheets (utility, erosion control, landscaping, lighting, signing & marking, signal, etc.) shall be the same scale as its corresponding roadway plan sheet.

CONSTRUCTION PLANS ORGANIZATION AND SHEET INDEX

Construction plans will be assembled in accordance with the Electronic Data Guidelines, current edition. The total sheets shown in the Index should be the total number of sheets in the plans. The total sheets shown in the upper right corner of each sheet should be the total number of sheets submitted for the final plan submission. Preliminary plans will be assigned temporary sheet numbers by using the sequence prefix followed by a two-digit number. Example: mainline plan sheets will be numbered 13-01, 13-02, 13-03, etc. These numbers are to be placed in small blocks in the lower right corner of the sheet.

COMPUTATIONS: All design computations and computer printouts shall be neatly recorded on 8 ½" by 11" sheets, fully titled, numbered, indexed, dated, and signed by the designer/Project Manager and checker. Project quantity computations shall be done in electronic spreadsheet format or directly processed from the most current GDOT approved version of **CAiCE**. The computer files, and two copies of the computations fully checked and appropriately bound, shall be submitted to the DEPARTMENT with the plans. A complete tabulation of the drainage analysis along with the calculations used to determine the size of drainage structures shall be submitted to the DEPARTMENT with the construction plans.

PRINT REQUIREMENTS: The CONSULTANT shall furnish all the prints necessary for the development of the preliminary and final construction plans and specifications. All prints shall be clear and legible. The DEPARTMENT will furnish all prints for bidding and construction purposes.

SUBMISSION OF PLANS: Upon completion of the detailed construction plans, special provisions and supplemental specifications, the CONSULTANT shall submit (1) set of mylar sepias and on set of prints to the DEPARTMENT for final review and approval. Any revision necessary as a result of the final review shall be made and resubmitted on mylar sheets by the CONSULTANT. The tracings and all other documents prepared under this Agreement shall then be submitted to the DEPARTMENT whose property they shall remain, without limitations as to their future use.

SUPPLEMENTARY INFORMATION ON CONSTRUCTION PLAN PREPARATION:

All of the following sheet descriptions and others required for completeness of the plans shall conform to the DEPARTMENT'S Plan Presentation Guide (PPG).

COVER SHEET:

The completed Cover Sheet shall include:

1. Project Description; Name of Road and general limits
   Example: I-285 Widening from Ashford Dunwoody Road to I-85
2. Project Number
3. County or Counties
4. Level of FHWA Oversight: Certification Acceptance (Exempt) or Non-Certification Acceptance (Non-exempt)
5. Georgia DOT Project Identification (PI) Number
6. Federal Route Number and Permanent or Temporary State Route Number
7. Stationing:
   a. Begin and End Limits of Construction on mainline and major side streets
   b. At regular intervals along project (every 100 feet minimum)
   c. Mainline and Intersection Equalities
   d. Begin and end limits of all bridges and bridge culverts; number bridges
   e. Railroad centerline (crossing equality station with the roadway)
8. City and County lines
9. State Routes, Federal Routes and other roads labeled
10. North Arrow and Scale
11. Location Sketch: This map may be sketched or digitized from a state or county map and should show a portion of the county or counties, major state or federal routes and other roads, important streams and railroads. The project alignment should be shaded and labeled. A north arrow, for the location sketch should also be included.
12. Northing and Easting "Project Midpoint" coordinates, zone of the coordinate grid system and year horizontal and vertical datum used.
13. Design Data:
    a. Functional Classification; for example: Urban Major Arterial

b. Traffic A.D.T.(base year)
c. Traffic A.D.T. (future, 20 year traffic)
d. Traffic D.H.V. (each way)
e. Directional Distribution
f. Percent Trucks (peak)
g. 24 hour Trucks
h. Speed Design

14. Length of PROJECT box; required columns for mile by county and total project miles for:
    a. Net length of Roadway
    b. Net length of Bridges
    c. Net length of Project
    d. Net length of Exceptions
    e. Gross length of Project
15. "This project is located _____% in _____County and _____% in Congressional District No. ____. County Code _____."
16. Along the bottom of the sheet: the project number, and the county. For Example: STP-189-1(25), Fulton County
17. Conventional Signs Legend showing general symbols used throughout the project.
18. "Plans Prepared by:" name and signature with Professional Engineer Stamp
19. "Under the Supervision of:" name of GDOT Liaison Engineer
20. Signature block for responsible office head (i.e. State Consultant Design Engineer, State Road and Airport Design Engineer, etc.)
21. Chief Engineer's signature block
22. Date of Completed plans for F.F.P.R
23. Date of Location and Design approval
24. Date of Completed plans
25. Revision Dates block

TRAFFIC FLOW DIAGRAMS:

These sheets provide the traffic data information to determine design criteria. The DEPARTMENT shall furnish the traffic data information. The CONSULTANT shall prepare the Traffic Flow Diagram sheets. The sheets are not required to be to a scale, but the drawing should show and represent the alignment

with cross roads and side streets following generally the alignment of the overall project. Two sets of diagram sheets are required, one which shows the Average Daily Traffic (ADT) and the other showing the peak Design Hourly Volumes (DHV). All sheets will contain the following information:

1. Label each sheet "Traffic Flow Diagram" with "Average Daily Traffic" or "Design Hourly Volumes" respectively.
2. Label and show a representative alignment of the proposed roadway.
3. Label and show a representative alignment for cross roads and side streets.
4. Indicate and show a general north arrow.
5. Show the total 24 Hour Truck percentage and the Single Unit "SU" and Multiple Unit "MU" percentage split on the ADT sheets. Show the peak hour truck percentage on the DHV sheets.
6. Indicate by arrows, all directional traffic pattern movements with the respective volumes.
7. On the ADT sheets, indicate the base-year and the 20-year design traffic. The base-year traffic is for the year the project is proposed to open. The 20-year design traffic should be shown in parenthesis.

   Example: 2005 ADT (2025 ADT)
8. On the DHV sheets, use the 20-year projected AM and PM peak volumes with the PM traffic volume in parenthesis.

   Example: AM (PM)
9. Show a legend to indicate what the traffic volumes represent as shown in 7 and 8 above.

TYPICAL SECTIONS:

The CONSULTANT shall provide all necessary typical sections required to describe the various mainline roadway sections and/or side and crossroads. Typical sections should provide a precise description of the proposed roadway and should conform to details as shown in the guidelines prepared by the Georgia Department of Transportation Pavement Design Committee.

Typical sections shall be described for the entire project. Gaps or overlaps along the project are not permitted. Each typical section should be numbered consecutively as it applies to the project and should show station to station limits for its application. When transitions occur between roadway sections show the variable distances and station to station limits for each transition. Typical sections for ramps, frontage roads, cross streets, side roads, or other conditions shall be additional sheets from the mainline typical

sections and clearly labeled/defined by name and stationing where they apply.

Typical sections should show exact dimensions (medians, travel-lanes, bike lanes, curb and gutter, shoulders, sidewalks, slopes, ditches, right-of-way, etc.) from the construction centerline. Locate and label the roadway profile grade line. Label appropriate items as to type and thickness. All slope controls should be specified on each typical section.

Typical sections should indicate the spread rates for Asphaltic Concrete and depths for concrete pavement and Graded Aggregate Base to be used on the project. When directed by the DEPARTMENT, the sections should indicate pay limits of material to be paid for by the square yard. The pavement structure described in the typical sections shall be those approved by the DEPARTMENT. The CONSULTANT shall supply the DEPARTMENT with the project cover sheet, preliminary typical section sheets and pavement designs during the course of the plan preparation for the purpose of presentation to the DEPARTMENT'S Pavement Design Committee.

Any special condition (such as v-gutter, guardrail, barriers, low point underdrain, etc.) should be shown as details on the typical section sheets unless these items are covered by a Georgia Standard or a construction detail, then a note should be included referring to the standard or detail.
The scale of each typical section may differ between the horizontal and the vertical in order to more clearly show the division between separate layers of the structure of the pavement.

CONSTRUCTION PLAN SHEETS:

Construction plan sheets shall include but are not limited to:

1. Existing topography. Buildings labeled as to type of materials. (If data is available) For example: Two story brick, Framed, etc.
2. Plan legend for all symbols
3. Land lot numbers and lines (shown and labeled). (If available from Right of Way.)
4. Land district numbers and lines (shown and labeled). (If available from Right of Way.)
5. G.M.D. numbers and lines (shown and labeled). (If available from Right of Way.)
6. City limits and county lines
7. North arrow

8. Construction centerline with bearing (Construction layout sheet or stakeout sheet).
9. Street Names - all existing locations including mainline, state route and U.S. No.'s.
10. Construction limits (labeled include symbols for cut (C) or fill (F)).
11. Existing R/W and existing L/A labeled.
12. Required R/W and required L/A.
13. Curve data for all roadways
14. (BLA) and (ELA) at access break points. Provide station and offset.
15. Dual project plans clearly show begin/end project. (By stations)
16. Begin and end construction. (By stations)
17. Angles and stations of all intersecting streets.
18. Edge of pavement (existing and proposed) and other roadway features, on mainline, cross roads and drives.
19. Equality stations and exceptions.
20. Roadway drainage, curb inlets, drop inlets, yard drains, culverts, channel changes, side and cross drains. All drainage structures shall be numbered and this number used consistently throughout the plans. Show the pipe size and direction of flow.
21. Permanent erosion control measures such as slope and ditch protections, detention ponds, rip rap, serrated slopes, etc.
22. Direction of drainage flow, and bodies of water adjacent to or up to 2000 feet downstream from project.
23. Driveways, tie ins and cross streets (label mainline intersection station)
24. Dimension pavement widths, proposed right of way, width of drives, radii, flares and tapers.
25. Superelevation and Superelevation transitions
26. Full station and offsets at all points on required right of way and easements including P.C. and P.T. stations.
27. Driveway easement should have full station and offset on all points.
28. Property owners name on all sheets applicable.
29. Guardrail, barriers and/or attenuators.
30. Right of Way markers.
31. Any other item deemed necessary by the CONSULTANT or the DEPARTMENT

ROADWAY PROFILE SHEETS:

The roadway profiles should include the following:

1. Existing ground line and elevations.
2. Proposed grades and elevations.
3. Special ditches, drainage structures and flow lines.
4. Vertical curve data including design speed.
5. Corresponding horizontal curves
6. Equality stations and exceptions.
7. Bridges with begin and end stations (50 and 100 year HW information for bridges over water)
8. Critical clearances for bridges over roadways
9. Begin and end construction station.

DRAINAGE PROFILE SHEETS:

Drainage Profiles shall be shown for all proposed drainage structures except side drains (under driveways). Existing drainage profiles shall be shown if pipe and structures are to be retained and when a proposed drainage system connects to it. Drainage structures shall be fully detailed and dimensioned. The following information is to be included on the drainage profiles and/or summary of quantity sheets:

1. Structure Nos. shall be shown on drainage profiles, plan sheets and drainage summary sheets for cross referencing.
2. Station and offset from centerline
3. Plot the pipe line, percent grade, and all inlets, junction boxes and manholes etc.
4. Skew angle to centerline of roadway (if applicable)
5. Size, length and type of structure.
6. Condition of structure (existing)
7. Height of structure for catch basins, drop inlets, manholes, etc.
8. Flowline elevations at all inlets and outlets
9. Height of fill over pipes and culverts (existing and proposed groundline)
10. Special foundation backfill material and imperfect trench backfill material.

11. Type of end treatment.
12. Slope and direction of flow.
13. Drainage Area, Q50, Q100, Hw50, Hw100 for cross drains.
14. Method of connection between proposed and existing structures.
15. Applicable standards, construction details and special designs.
16. All quantities to complete drainage and erosion control.

All cross drain structures will be sized by the P.C. computer program HY-8. The Allowable Highwater will be the existing 100-year elevation plus 1.0 foot.

All drainage structures that are in a designated floodway must be sized to comply with the FEMA regulations. FEMA structures require the computer analysis from FEMA, usually HEC-2 analysis. Remodel the floodway and do not increase the 100-year storm more than 1.0 foot total. If the floodway must be altered, all the necessary maps and computer printouts must be included in the drainage analysis and the CONSULTANT shall ensure that all FEMA and Local Government requirements are satisfied. When changing sizes of pipes the top elevation of the pipes shall be the same and the flowlines will change. All other guidelines and computation sheets are in the "Manual on Drainage Design for Highways". The CONSULTANT shall submit all drainage preliminary computations with the plans for the Preliminary Field Plan review. Final drainage computations shall be submitted with plans for Final Field Plan Review.

EROSION AND SEDIMENT CONTROL SHEETS:

Erosion and Sediment Control plans detail the temporary erosion control devices to be used during construction. These devices include, but are not limited to: sediment basins, sediment traps, silt control gates, floating silt retention barriers, check dams, silt fence (types A, B, & C), bailed straw, ditch checks, brush barriers, and slope drains. Additional plan sheets may be required for each stage of construction.

STAGE CONSTRUCTION SHEETS:

Stage Construction plans detail one method by which the contractor can build the project. The plans shall show the maintenance of traffic while detailing what portions of the roadway can be built during the

specific stage. Each stage shall also include a written description of what can be built during this stage.

Temporary alignments, profiles, and cross sections may be required to provide adequate information to the contractor for each stage. In addition, plans sheets for each stage may also include but are not limited to:

1. Erosion control
2. Temporary signing, marking and signals
3. Locations for temporary variable message signs
4. Locations for temporary barrier, impact attenuators, barrels
5. Location of temporary drainage
6. Location of travel lanes to remain open
7. Detour roadways/ haul road/maps
8. Location of temporary walls
9. Location of temporary bridges
10. Quantities for stage construction

SUMMARY OF QUANTITY SHEETS:

The Summary of Quantities is a tabulation of the items of work, quantities, and units of measurement for a particular project. Each item shall be summarized by one of the following four methods:

1. Sheet by Sheet: Placing all quantities required on each individual sheet together on a single line in a spreadsheet format (most roadway items). Example: Paving items, Curb and Gutter, right of way markers.
2. Station by Station: Listing quantities that will be required from a given beginning station to a given ending station. Example: Walls, Ditch Protection, and Temporary Silt Fence
3. Exact Station: Listing quantities that will be required at a specific location. Example: Drainage Structures, Sediment Basins, Spring Box and Summary of Driveway Quantities.
4. Lump: Quantities that will be required for the complete project. Example: Grassing, Traffic Control and Earthwork Quantities.

Notes, if required, shall be placed under the corresponding Quantity Boxes. Each Note shall consist of special requirements, method of payment, regulations or directions prepared to cover the work

required which is not covered by the Standard Specifications, or for General Information.

All quantities calculated and shown in the Summary of Quantities shall be to the nearest whole number. Any item pertaining to linear mile shall be to the nearest thousandth of a mile. "As Directed by Engineer" quantities shall only be added upon recommendation from the DEPARTMENT. Any quantity amounts to be rounded off shall occur only when transferring them from the Summary Boxes to the Detailed Estimate Sheet. See the Detailed Estimate sheet discussion below for information pertaining to rounding off.

DETAILED ESTIMATE SHEET:

The Detailed Estimate Sheet for a set of construction plans is one of the most important sheets. It is a precise listing of all the different pay item types and materials with quantity amounts needed to construct the project. The Detailed Estimate is used by the Department to prepare the bid item proposal booklets, which are sold to contractors for the purpose of submitting an itemized Cost Estimate for the proposed construction work.

The Detailed Estimate Sheet(s) are to be placed in the plans immediately following all summary of Quantity Sheets. The Detailed Estimate Sheet will read in double columns from top left to bottom right with the top being the 35" side of a plan sheet sized 23" by 35". The line items will be spaced and so divided as to provide a clear and legible Detailed Estimate. The quantity amounts to be shown for each pay item shall be transferred from the summary to the Detailed Estimate Sheet as follows:

1. Use only whole numbers on the following:
   a. miles
   b. Acres
2. For pay items with the unit of measurement "EACH" - the summary and detailed estimate quantity must match.
3. For large quantity items with small unit costs, anything over 1000 units, such as Unclassified Excavation, carry the next highest even 100 forward to the Detailed Estimate regardless of the last two digits. For example: 16,206 cubic yards should be carried forward as 16,300 cubic yards.
   21,433 cubic yards should be carried forward as 21,500 cubic yards.
4. For intermediate quantities, 100 to 1000 units, such as pavement or pipes carry the next highest even

10 forward. For example: Paving items: 284 tons, use 290 tons

Pipe: 271 LF, use 280 LF.

5. Small quantities of 100 units or less carry the same total forward unless it contains a decimal. Where a decimal occurs, use the next highest whole number. For example:

   33 cubic yards Class "A" Concrete, use 33 cubic yards.

   65.2 square yards. Conc. Approach Slab, use 66 square yards.

6. For quantities of less than 1 always use 1 unit. Example: 0.35 mile, use 1 mile
7. For hybrid quantities with a lump sum pay item, the Detailed Estimate item unit and quantity column must be "LUMP". For example, Clearing and Grubbing - *Project Number* LUMP LUMP.
8. The pay item numbers shall be in numerical order within their respective category. The usual procedure in making the Detailed Estimate is as follows:
   a. Roadway items
   b. Drainage items
   c. Erosion control - permanent
   d. Erosion control - temporary
   e. Signing and Marking & Signal items
   f. Concrete Bridge Culvert items (each culvert listed separately)
   g. Wall items (including alternates if applicable)
   h. Bridge items (including alternates if applicable)